

Water Quality Best Management Practice Monitoring Framework

JH Stone Nursery Pesticide Use

February 2020

This monitoring framework was developed in accordance with the Water Quality Best Management Practice Technical Guides (2012 and 2018). The Forest Service relies on best management practices (BMPs) to ensure compliance with the Clean Water Act; water quality BMPs are integrated into the pesticide use project design features approved in the 2020 Decision Memo:

- Minimize overall use of pesticides by implementing integrated pest management methods; continue to utilize mechanical, manual, biological and cultural methods where cost-effective.
- Minimize use of chemicals that are more mobile and persistent (oxyfluorfen, propiconazole), especially prior to or during the rainy season.
- Minimize use of pesticides that have been detected with increasing frequency in local aquatic habitats (glyphosate, oxyfluorfen).
- Use chlorpyrifos only in the greenhouses, limited to one application per greenhouse per year. Favor other effective products.
- Manage timing of spraying and irrigation to minimize delivery of chemicals into Jackson Creek.
- Use cover crops and reduce tillage where appropriate.
- Minimize potential for drift by selecting appropriate nozzle size and spray pressure, monitoring weather, and adjusting spray height, etc. Protect non-target resources with drift shields if needed. Avoid broadcast within 100 feet of flowering plants attractive to pollinators.
- Promptly clean up all spills, including treated seed. (Please note no reportable spills of pesticide have occurred at the nursery.)
- Use adjuvants approved for use on aquatic environments by Washington state.
- Err on the side of caution when interpreting label guidance.

The monitoring framework is intended to help nursery staff implement and monitor design features for ongoing pesticide use. As is outlined in the 2018 BMP Monitoring Technical Guide, the first step in determining how well the best management practices are working to protect water quality is determining whether they are being implemented as planned. Results can then be more fully and fairly interpreted based on the implementation monitoring record. The monitoring framework relies on pesticide applicators documenting adherence to the design features during implementation. Actual experience can then be compared to predicted results and practices can be modified as needed, based on a documented record.

The Middle Rogue Pesticide Stewardship Partnership (MRPSP) has collected and analyzed stream water in the Middle Rogue to determine the presence and

concentration of pesticides in the vicinity of the nursery and elsewhere through the basin. Oxyfluorfen has been detected in the Jackson Creek watershed at frequencies and concentrations that are above a threshold of concern for aquatic plants. The detections within the watershed were at 50% of this aquatic life benchmark or greater during the period 2016 - 2018. The oxyfluorfen detections meet the criteria for designation as a Local Problem Pesticide within the Middle Rogue area.

The MRPSP's goal is to reduce the frequency of detections of oxyfluorfen to below 35% while achieving benchmark concentrations below 50%. Measurable reductions in concentrations and detection frequencies are intended to occur each year leading up to the goal of any detection categorized as a Low Category of Concern by December 31, 2021. The monitoring framework will help the nursery manager determine whether the approved design features are helping the MRPSP meet its goals for oxyfluorfen in Jackson Creek.

The nursery pesticide use monitoring framework is summarized below. The intent is to use current documentation methods and minimize additional burden to nursery staff, however some changes to record keeping practices may be required.

Monitoring Question	Objectives, BMPs, Design Features	Monitoring Documentation	Who	When
Is oxyfluorfen and glyphosate application being managed to avoid delivery to Jackson Creek via storm drains?	-Minimize use of oxyfluorfen and glyphosate -Check weather predictions prior to spray; do not spray oxyfluorfen in production fields if significant rainfall (more than 1/10 th inch) is predicted within the week -Discontinue irrigation if run off into storm drains is observed.	Document considerations for specific chemical use prescriptions. Daily log. Document how irrigation was managed to avoid run off. Document measurable rainfall during and for one week following spray.	Prescriber, Applicator	Before, During and After Spraying
Are MRPSP goals for oxyfluorfen being met in Jackson Creek?	Coordinate with MRPSP to correlate changes to oxyfluorfen use and adherence to design features and BMPs and water sampling results. If goals are not being met, consider additional water sampling.	Maintain records about oxyfluorfen spraying as described and share results.	Nursery Management	As needed, at least annually

Monitoring Question	Objectives, BMPs, Design Features	Monitoring Documentation	Who	When
Are pollinators being exposed to insecticide?	Do not spray insecticides in production fields when crop plants are flowering within 100 feet of broadcast spraying.	Document flowering plant absence or action taken to avoid flowering plants.	Applicators	Daily log during flowering season
Are alternatives to chlorpyrifos effective in production fields?	Chlorpyrifos is limited to greenhouse/shadehouse complex only, and only once per year, and the IDT recommends use be discontinued altogether if possible. Alternative insecticides have been recommended. The intent is to effectively treat insect pests (especially fungous gnat and aphids) despite restrictions on chlorpyrifos.	Document presence and extent of target pests in production fields and effectiveness of treatment	Applicators	Daily log during pest outbreak and after treatment
Does pesticide use adhere to BMPs (design features)?	Decision provides specific sideboards for amount of active ingredient, extent, application technique, location, frequency and season of use for all pesticides. Ensure weather conditions are appropriate for application; avoid drift reaching non-target resources.	Normal record keeping. Document considerations for specific chemical use prescriptions. Compare actual total annual use to sideboards; consider overall program effectiveness and need for adjustments.	Nursery Manager and Applicators	End of year review.

BMP MONITORING FRAMEWORK CHECKLIST

The following checklist shows the parameters that would be documented under the monitoring framework before, during and after spraying. Record keeping that may go beyond current requirements is highlighted.

PRESCRIPTION PROCESS PRIOR TO SPRAYING

- ✓ Pesticide Use Proposal;
 - Document Active Ingredient,
 - Product Name,
 - Rate
 - Adjuvant Info
 - Applicable Project Design Features

IMMEDIATELY PRIOR TO SPRAYING: Weather Check

- ✓ **Weather Check: Clip forecast to prescription; determine spray scheduling.**
- ✓ **Is measurable precipitation predicted within 1 week of spraying? CAUTION: Avoid spraying oxyfluorfen if 1/10th inch of precipitation or more is predicted within one week of spraying.**

DAILY LOG DURING SPRAYING

The following parameters are already part of daily record keeping during spray operations:

- ✓ Application Date
- ✓ Time Start
- ✓ Time Stop
- ✓ Application Area
- ✓ Dilutant Used
- ✓ Certified Applicator Name
- ✓ Additional Applicator Name
- ✓ Volume Applied
- ✓ Calibrated Volume
- ✓ Wind Speed
- ✓ Wind Direction
- ✓ Cloud cover
- ✓ % Relative Humidity
- ✓ Temperature
- ✓ Distance to water
- ✓ Remarks (Field ID)
- ✓ Document Spills (report as required)

Additional parameters for BMP Monitoring Framework for Broadcast Application in Production Fields:

- ✓ **Document that equipment calibration is occurring as needed**
- ✓ **Document wind speed (between 2 and 8 miles per hour)**
- ✓ **Document measures taken to minimize drift**
- ✓ **Document absence of flowering plants within 100 feet of broadcast target**

UP TO ONE WEEK FOLLOWING SPRAYING

- ✓ **Add remarks to daily log documenting measurable rainfall within one week of spraying**
- ✓ **Add remarks to daily log documenting how irrigation was managed to minimize or eliminate run off into storm drains**

SEASONALLY/ANNUALLY

- ✓ **Document integrated treatment effectiveness (FACTS requirement) and recommend adjustments**
- ✓ **Compare actual annual use to sideboards**
- ✓ **Coordinate with pesticide stewardship partnership to determine whether pesticides are present in Jackson Creek and goals for oxyfluorfen are being met.**

Design Features and Sideboards per Active Ingredient

Active Ingredient ¹	Product Name	Application Rate Product	Application Rate Active Ingredient	Extent	Entries per Year	Notes
Herbicides						
Aminopyralid	Milestone	6.0 oz./acre	0.0976 lbs./ac.	5.0 ac	1	If applied on grass fields, the straw cannot be used for mulch or compost.
Clopyralid	Stinger	8.0 oz./ac.	0.375 oz./acre	20 ac.	1	If applied on grass fields, the straw cannot be used for mulch or compost.
Dicamba	Banvel	1 pt./ac.	0.5 lbs./ac.	4 ac.	1	
Glyphosate (Aquatic Label)	RoundUp Custom	1-2 qts./ac.	1.4-2.7 lbs./ac.	30 ac	2 to 4	Minimize use due to frequency of detection in watersheds.
Imazapic	Plateau	12 oz./ac.	0.1875 lbs./ac.	2 ac.	1	
Imazapyr	Arsenal	2.0 qts./ac.	1.0 lbs./ac.	<1/10 th ac.	1	
Oryzalin	Surflan	2.0 qts./ac.	2.0 lbs./ac.	30 ac	1 to 2	

¹ Please note that new active ingredients would need to be screened to determine whether there could be effects on fish and the aquatic environment that could trigger need for new ESA consultation. If product name changes, but relies on the same active ingredients, apply design features accordingly and document changes in rate of active ingredient. With the exception of oxyfluorfen, chlorothalonil, esfenvalerate, chlorpyrifos and pyriproxyfen, changes to rate, extent or other sideboards are not likely to change effects to the aquatic environment, as long as labels are followed (please err on the side of caution). For oxyfluorfen, chlorothalonil, esfenvalerate, chlorpyrifos, pendimethalin, and pyriproxyfen, please check with pesticide use coordinator and fish biologist to see if increases in rate or changes to other sideboards trigger need for ESA consultation.

Active Ingredient ¹	Product Name	Application Rate Product	Application Rate Active Ingredient	Extent	Entries per Year	Notes
Oxyfluorfen	GoalTender	0.5-1 pts./acre	0.25-0.5 lbs./acre	30 ac	2 to 4	<p>Minimize use due to persistence and mobility; frequency of downstream detection and concentrations of oxyfluorfen found. Special concern for delivery to Jackson Creek. Avoid use if 1/10th inch or more of rain is predicted within one week. Manage irrigation to avoid run off via storm rains.</p> <p>Risk assessment/ESA consultation indicates moderate risk to aquatic plants and invertebrates. See pesticide use coordinator for application rate changes. See fish biologist for changes in extent, design features, or other sideboards to determine whether changes are within scope of consultation.</p>
Pendimethalin	Prowl H2O	2.0-4.0 qts./ac.	1.9-3.8 lbs./ac.	2.5-10 ac	1 to 2	<p>Risk assessment/ESA consultation indicates that use at this rate is below a threshold of concern, however increases in rate or amount of pesticides could raise concerns. See pesticide use coordinator for application rate or extent changes to determine whether changes are within scope of consultation.</p>
Prodiamine	Barricade 65WG	1.0 lbs./ac.	0.65 lbs./ac.	30 ac	1	
2,4-D (acid)	2,4-D Amine	32.0 oz./ac.	0.95 lbs./acre	40 ac	2	

Active Ingredient ¹	Product Name	Application Rate Product	Application Rate Active Ingredient	Extent	Entries per Year	Notes
Insecticides						
Azadirachtin	Azatin XL	1.0 to 2.0 lbs./ac.	0.5 to 1.0 lbs./ac.	5 ac	1 to 4	
Bt israelensis	Gnatrol	2.4-4.8 oz./ac.	0.0124-0.0247 lbs./ac.	n/a	2 to 6	Greenhouses/Shadehouse Only
Chlorpyrifos	Lorsban, DuraGuard	2.0 oz./100 gal.	0.5 to 1.0 lbs./ac.	n/a	1 per greenhouse/shadehouse	Greenhouses/Shadehouse Only, no more than once per year per greenhouse, Worker PPE. Risk assessment/ESA consultation indicates high risk to fish and aquatic organisms. ESA finding of NLAA based on these rates and sideboards (rates, location, number of entries).
Esfenvalerate	Asana	8-16 oz./ac.	0.0124-0.0247 lbs./ac.	30 ac.	1 to 2	Application Buffer on Jackson Creek. Risk assessment/ESA consultation indicates moderate risk to fish and invertebrates. See pesticide use coordinator for application rate changes. See fish biologist for changes in extent, design features, or other sideboards to determine whether changes are within scope of consultation.
Pyriproxyfen	Distance	8-16 oz./100 gallons	0.2144 lbs./ac.	n/a	1 to 4	Greenhouses/Shadehouse Only. See pesticide use coordinator for application rate changes. See fish biologist for changes in extent, design features, location or other sideboards to determine whether changes are within scope of consultation.
Fungicides						

Active Ingredient ¹	Product Name	Application Rate Product	Application Rate Active Ingredient	Extent	Entries per Year	Notes
Chlorothalonil	Daconil Weatherstik	2.75 pts./ac.	2.1 lbs./ac.	10 ac	1 to 2	Risk assessment/ESA consultation indicates moderate risk to fish and invertebrates See pesticide use coordinator for application rate changes. See fish biologist for changes in extent, design features, or other sideboards to determine whether changes are within scope of consultation.
Iprodione	ChipCo 26GT	1.0 qt./ac.	0.50 lbs./ac.	10 ac	1	
Mancozeb	Dithane 75DF	1.5 lbs./ac.	1.125 lbs./ac.	7 ac	1 to 2	
Mefenoxam	SubdueMaxx	1.25 pts./ac.	0.31 lbs./ac.	2 ac	2	
Propiconazole	Tilt	6.0 oz./ac.	0.17 lbs./ac.	30 ac	1 to 2	
Thiophanate-methyl	3336 WP	8.0 oz./100 gal.	0.375 lbs./ac.	1 ac	2 to 5	Greenhouses/Shadehouse Only
Thiram	Thiram 480DP	8.0 oz./100 lbs. of seed	NA	NA	1	Worker PPE
Fumigant						
Dazomet	Basamid	350 lbs./ac.	350 lbs./ac.	30 ac	1	Worker PPE, application buffers
Algaecide						
Sodium carbonate peroxyhydrate	Green Clean Pro	50 lbs. per ac./ft. of water	42.5 lbs. per ac./ft. of water	27.5 ac./ft. of water (25% of 110)	< 1 (fewer than 1 per year)	
Surfactants						Use Washington State list approved for aquatic use